

Research Article

Development of Stop-Motion Video Biology Learning Media on Ecology Material for Class X MA Al-Muwahidin Lelede

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ABSTRACT

Technological advances and developments in science are currently having a big influence on the world of education. Especially on methods or strategies in learning. Therefore teachers must be innovative and creative to act as friends, intermediaries and facilitators who create favorable conditions for the construction of knowledge in the learning process. The aim of this research is to find out how to develop stop-motion video biology learning media and to determine the suitability of the media and students' responses to the biology learning media being developed. This development was carried out using the development model by Thiagarajan, namely 4D which has been reduced to 3D, namely, Define, Design (media design), Develop (media development). The results of the research show that the development of stop-motion video biology learning media obtained a feasibility test percentage by validators of 72.94% with "valid" criteria and teacher responses with a percentage of 84% so it can be said to be suitable for use. The results of the field test of student responses obtained a percentage of 86.69% with the criteria "very positive". Based on the validator test and the results of student and teacher responses, it can be concluded that stop-motion video biology learning media is suitable for use and can be well received.

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**INTRODUCTION**

Progress technology and development knowledge knowledge moment this is very influential big to the world of education. Especially the method or deep strategy learning. Now teacher or educator No only become center source study for participant educate. The purpose of paradigm teaching moment This is for act as friends, intermediaries, and facilitators who create favorable conditions for construction knowledge. Teachers must innovative and creative for do this. Become innovative is action create something new or own quality renewal, meanwhile creative is circumstances own creativity or Power copyright (Pangestu et al., 2021).

Learning is an involved process contact between teachers and students or action taken in environment learning that includes a number components, including objectives learning, learning media, methods, materials, educators or teacher, setting or environment, and evaluation. If learning media used For support it so learning will more effective (Arfah, 2019). Instructional Media That Alone have a number of excess among others, namely For help participant educate present data with OK , hooking up understanding , making it easier in know something material, as well awaken hope as well as interest as well as motivation and stimulation activity Study even bring effects psychological to students and resulting in the learning process more active, creative as well as varies (Suryani, 2019).

Based on interview with the lesson teacher biology at MA Al - Muwahidin Lelede father Mujitahid , S.Pd. and Fahrurrozi , S.Pd. obtained information that the media already given by the teacher still less , that is only use book packages , worksheets and several other 3D media that have been general used. That matter Not yet can be optimal in help student know material lesson biology in a way maximum. the media Still not enough creative as well as varies, as as a result produce student will feel fed up in class during the learning process taking place. Use technology as well as development knowledge knowledge Can give influence big towards the learning process (Devi, 2018). Student will more practical, focused as well as easy understand material taught in the learning process earlier. That thing Can done with utilise progress technology Now that is with forming video- based media such as stop motion videos.

Various study previous has carried out by Herlisa Syafira, with study entitled, "Development of Learning Media Video Based Stop-Motion on System Material Blood Circulation at Ali Hasjmy State Middle School Aceh Besar Regency". According to findings research, reaction student towards the media is very good, so clear that this medium is very suitable For used during the learning process (Syafira, 2021). Making Stop Motion Animation Video Learning Media in Class X, Arts and Culture Subject at SMKN 11 Semarang title another research conducted by Tri Lestari (Ramadhan, 2023). Findings study show that use material learning stop motion video based increase results Study student. This media can help student in understand lesson, no only interesting interest and motivation These media students are also improving results study student.

Researcher choose using stop motion video become a learning medium with reason because the video is stop motion have superiority Where the video Can give as well as displays a material lesson biology with presentation interesting and easy student in understand points the material explained, can develop imagination participant education, and creation more economical and simple (Ideari, 2016). Using stop motion video this is also possible utilise technology and science knowledge moment this.

Based on the description has been shown above that in the learning process learning media that can be used help student in the learning process and as tool help the teacher in teach more creative and varied. Therefore that objective study This is for know method developing learning media biology stop motion videos as well as know media appropriateness and response student towards learning media biology stop motion video.

METHOD

Place study This done namely at MA Al- Muwahidin Lelede, Kediri District, West Lombok Regency, West Nusa Tenggara Province. Research time This carried out in May - October 2023.

Type of research used is research and development or Research and Development (R&D) that is targeted research for create product new through the development process. Development of learning media This using a 4D development model by Thiagarajan (Mulyatiningsih, 2012). Then reduced into divided 3D into 3 stages development, that is Define, Design (media design), and Develop (media development).

Instrument research used among them, namely instrument validation media experts and experts materials, instruments questionnaire teacher responses, and instruments questionnaire response student. Deep data analysis techniques study this is technique descriptive data analysis quantitative.

RESULTS AND DISCUSSION

A. Model Development Results

Research and development used in research this done using a model developed by Thiagarajan called 4D. Development style This consists of 4 stages development, that is *Define*, *Design* (media design), *Develop* (media development), and *Disseminate* (media distribution). Subjects of research This that is student class X MA Al- Muwahidin Lelede whereas object of research is a learning medium Biology *Stop-Motion* video on the material Ecology. As for the results 3D development has been done researcher as following:

1. Definition (*define*)

At this stage, researcher do analysis problems and objectives of learning media at MA Al- Muwahidin Lelede this done with method observations and interviews students and teachers.

Following is results analysis needs carried out at MA Al- Muwahidin Lelede:

a. Analysis Curriculum

The curriculum implemented at MA Al - Muwahidin Lelede that is 2013 curriculum . Curriculum objectives covers four competence , namely (1) competence spiritual attitude , (2) attitude social , (3) knowledge , and (4) skills . Competence the achieved through the learning process intracurricular , cocurricular , and/ or extracurricular .

As for the development of *stop motion* videos This supports core competencies 3 and 4 , namely knowledge and skills . Basic Competencies include , 3.1 Analyzing information / data from various source about ecosystem and all interactions that take place within it . 4.1 Simulating interaction between component in something ecosystem . Formulation competence knowledge , that is discuss various data component ecosystem and linking them with balance existing ecosystem; discuss and conclude that in nature happen balance between Biogeochemical components and processes . Formulation competence skills , ie explain in a way oral component ecosystem , biogeochemical processes , no balance ecosystems and flows energy .

b. Analysis Package Book

Book package used in learning is book package Biology 1 for class X SMA and MA. Book package This refers to learning biology based on Improved 2013 curriculum . Ecology Material as object study This is in the book Chapter IX package . The learning objectives in chapter IX are (1) Explain components compiler ecosystem ; (2)

Differentiating use terms habitat, population, community, ecosystem, factors biotic, and factors abiotic; (3) Identify various interactions that occur in ecosystem; (4) Connecting understanding chain food, webs food, pyramid ecology, cycle material, and cycle biogeochemistry; (5) Explain various type ecosystem. Out of 5 points objective learning the supported in the stop motion learning video that was developed. In chap IX material ecology This done 3 meetings or 6 hours of lessons.

c. Analysis Students and Teachers

Based on results interview with students and teachers at MA Al- Muwahidin Lelede obtained information that the learning process biology usually only using learning media book package from school or not there is learning media or tool help Study other. Especially also on the material Ecology in class X no there are learning media used. This matter felt not enough maximum Because convey bullet points material only with lecture just. Whereas needed tool help For makes it easier delivery bullet points material.

Learning media in schools it is still very minimal especially regarding material Ecology. On the material ecology This there is bullet points difficult material understood students, namely in points material interactions that occur in ecosystem, chain food, webs food, pyramid food, and recycling biogeochemistry.

As for the results interview student obtained information that method teach teacher ie only with lecture and give assignments, teachers don't Once using learning media in the learning process, teaching materials used in class that is book packages and worksheets, students feel bored moment learning goes on, and obeys students interesting learning process is with watch. By general, students feel more easy understand something material with method seen, heard and done.

Analysis results need that learning at school the Already walk with OK, but the media already given by the teacher still less, that is only use book packages, worksheets and several other 3D media that have been general used. That matter Not yet can be optimal in help student know material lesson biology in a way maximum. the media Still not enough creative as well as varies, as as a result student will feel fed up in class during the learning process taking place. Learning process at school that is also lacking utilise available technology.

Based on description the interesting and useful learning media is needed existing technology available so that can help teachers and students in the learning process.

2. Designing

Stage second in the 4D development model is *Design* or stage designing. Stage This covers stage design initial / prototype materials / devices to be developed. *Stop motion* videos This made use application *Stop Motion Studio* For take picture and applications *Capcut* For added audio and instruments song in the video. Following appearance application *Stop Motion Studio* can seen in Image 1.

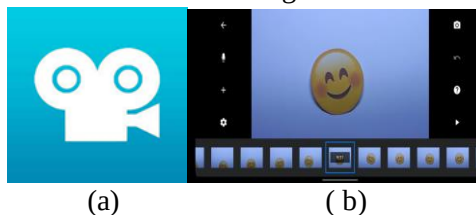


Image 1. (a) *Stop Motion Studio*; (b) Display in application.

Design making *storyboards* designed based on material raised that is material Ecology, KD 3.1 Analyze components ecosystem and interactions between component 4.1

Present work that shows interaction intercomponents ecosystem , web food , and cycles biogeochemistry , indicators and searching Images in accordance material . As for the display the beginning of *stop motion* video media can seen in Image 2.



Image 2. Cover and display appearance beginning material

3. Development (*develop*)

Based on design that has been created , *stop motion* video learning media developed For produce product . As for the display product the shown in Image 3.



Image 3. Appearance product beginning

Design the beginning already developed furthermore validated by the lecturer media experts and experts material . Stage validation This it could also be said as evaluation purposeful formative For give input from experts related to the learning media being developed . As for suggestions and input from the validator can seen in Table 1.

Table 1. Validator Suggestions and Input

Validator	Suggestions and Feedback	Information
Media Expert Validator and Material Expert	Suitability movement picture with audio in the video.	Accepted , with do the movement picture .
	Indicators and KD added at the beginning of the video.	Accepted , with add indicators and KD at the beginning of the video.
	Instrument music in the video replaced with a more cheerful and enthusiastic one .	Accepted , with replace instrument music in the video.
	Material writing in more videos enlarged .	Accepted , with enlarge the written material in the video.
	Appropriate instrument volume with audio volume.	Accepted , with do improvements to instrument volume and audio .
	The audio tone in the video is more firm and cheerful so heard more enthusiastic .	Accepted , with do improvements to sound Audia .

Writing and pictures in the video
no must Keep going move .

Accepted , with do
improvements to writing and
image movements .

Suggestions and input from the validator is accepted with do corrections to the table on . After That done revision product beginning before tried out . Revision design done For repair *stop motion* video learning media products with reduce weaknesses product . As for revisions learning media products found in media displays in videos, music instruments , and audio in videos. So that based on revision the only can displays media display .

Based on suggestions and input from the validator is carried out revision product before product tested try . As for the results revision product media display can shown in the following image :

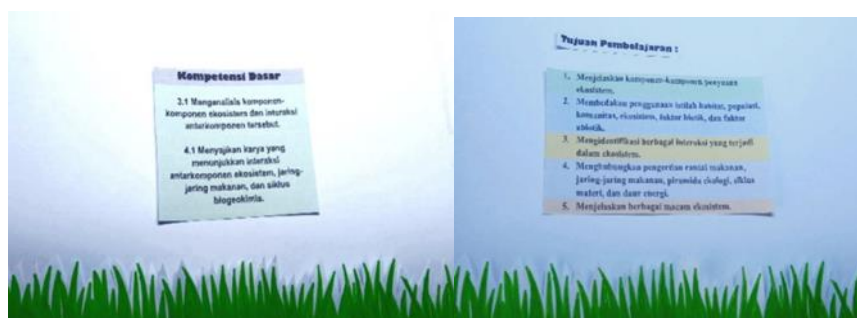
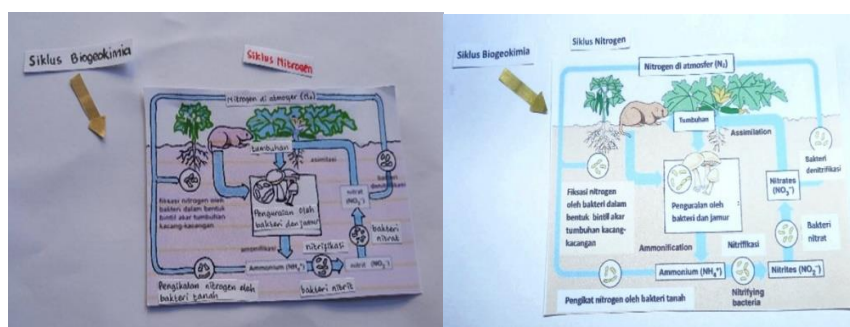


Image 4. Supplement Basic Competencies and Learning Objective



(before revision)

(after revision)

Image 5. Revision picture more clear



(before revision)

(after revision)

Image 6. Revision more pictures and writing clear

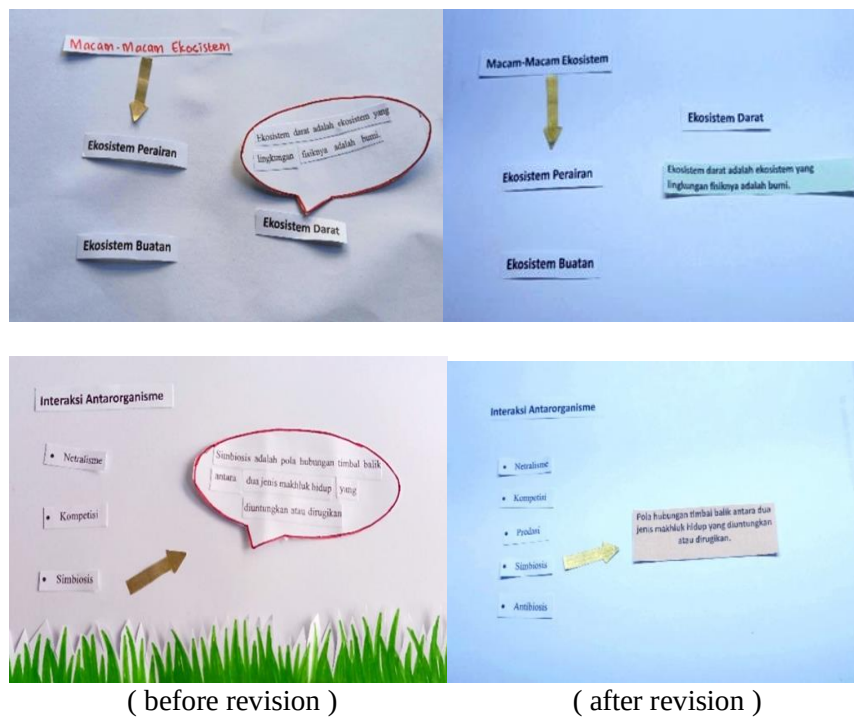


Image 7. More writing revisions clear

After done revision product Then *stop motion* video learning media products testing was carried out or developmental testing. At stage This is the plan teaching materials that have been revised based on input and suggestions from validators are tested to student . The purpose of the trial This is For get bait come back from students order the product results development more effective . Student can watching *stop motion* videos through link (<https://bit.ly/VideoStopMotionEkologi>) or through *scan barcodes* under This .



Image 8. Stop Motion Video Barcode

B. Model Effectiveness

1. Media Eligibility

Initial designs have been made developed furthermore validated by the lecturer media experts and experts material from the Biology Science Study Program at UIN Mataram . Validation product carried out by Dr. Nining Purwati , M.Pd. and Mr. Dr. Yusuf , M.Pd. As for the results from the validation test of *stop motion* video learning media can seen in Table 2.

Table 2. Validation Results of *Stop Motion* Video Media

Aspect Evaluation	Evaluation		Average Percentage (%)
	Validator 1	Validator 2	
Appearance	31	31	72.94
Language	21	21	
Material	10	10	
Amount	62	62	
Percentage	72.94	72.94	

Validity (%)			
Information	Valid	Valid	Valid

Based on table above show that results whole acquired aspects amounting to 72.94% with "valid" category so that the learning media is *stop-motion* video worthy used in the learning process.

2. Teacher Response

A teacher can see and judge draft or method used in activity learning and teaching with method observe response shown by students , so response own role important in the learning process. Here's the teacher regarding feasibility of *stop-motion* video learning media can seen in Table 3.

Table 3. Questionnaire Results Teacher Response

No.	Aspects seen	Total Score	Max Score
1.	Animated videos <i>stop motion</i> effective For made tool in achievement indicators and goals learning	4	5
2.	Animated videos <i>stop motion</i> effective For used as internal media A learning	5	5
3.	Material presented in animated videos <i>stop motion</i> complete	3	5
4.	Animated videos <i>stop motion</i> capable For used as a learning medium	5	5
5.	Language used according to EYD	5	5
6.	Language used easy understood	4	5
7.	There is no error in writing animated videos <i>stop motion</i>	4	5
8.	Size text presented _ in animated videos <i>stop motion</i> appropriate , no too big and not too small	3	5
9.	View the video presented interesting interest Study student	5	5
10.	Design or <i>background</i> from animated videos <i>stop motion</i> is interesting and good	4	5
Total _		42	50
Average Percentage (%)		84%	
Criteria		Very Positive	

Table 3 above show that the average value obtained based on results lesson teacher response by 84% with very positive criteria. So this *stop motion* video learning media on ecological material is very good and well received by the subject teachers.

3. Response Student

Instructional Media *stop motion* videos that have been through stages validation media experts and experts material and subsequent teacher response tried out to student . The purpose of the trial This is For get response from students order the product results development more effective . Trial stage This use questionnaire filled out by 16 students with 14 items related questions with evaluation they to product results development . Questionnaire results response student shown in Table 4.

Table 4. Questionnaire Results Response Student

Total Aspects seen	Assessment Score				
	5	4	3	2	1
	605	300	57	2	8
Total Score	972				
Max Score	1,120				
Average Percentage (%)	86.69%				
Information	Very Positive				

Based on results table above what is obtained from test results products for students filled in by 16 students with 14 questions show frequency 605 is very positive , frequency 300 is positive , frequency 57 is less not enough positive , frequency 2 is not positive , and frequency 8 is not agree . The results of the data obtained percentage a total of 86.69% with "very positive " criteria , so can concluded that the learning media *is stop motion* video worthy For used in the learning process .

C. Discussion

Study This produce *stop motion* video learning media products on the material Ecology class X. Products This developed with using a 3D development model , namely , *Define* , *Design* (media design) , and *Develop* (media development) .

Stage *Define* or definition This done analysis towards learning media in schools with method observation and interviews . Based on results observations and interviews obtained information that learning at school Still not enough use of learning media and not utilise existing technology .

Stage *Design* or stage planning This researcher use printed images with last HVS paper cut pieces in accordance the shape Then arranged one by one and take picture use application *Stop Motion Studio* . Researcher use One addition application that is *CapCut* For edit *frames* become a video along with it music instruments and included original audio researcher as explainer in the video. Addition application For edit This can also be replaced with other applications are the same its use in accordance with what you want .

Stage design This is required stage accuracy in compiling and arranging cut writing and images , and when enter pieces picture is a must customized the movement with audio in video as needed thoroughness and patience in do it . Number of frames or resulting image from learning video design This is a total of 1,302 images are combined and form a movie.

Stage *Develop* or development This is stage validation product initial , revision and trial product . Initial designs have been made developed furthermore validated by the lecturer media experts and experts material . Results results from validation show that evaluation *Stop motion* video learning media products are declared "valid" by validators average value of percentage of 72.94% in the range value 60-80 so *stop motion* video learning media product developed stated worthy For tested in the field in accordance with validator suggestions and input .

Percentage yield feasibility of *stop motion* video learning media on the material ecology based on each aspect can seen in Image 9.

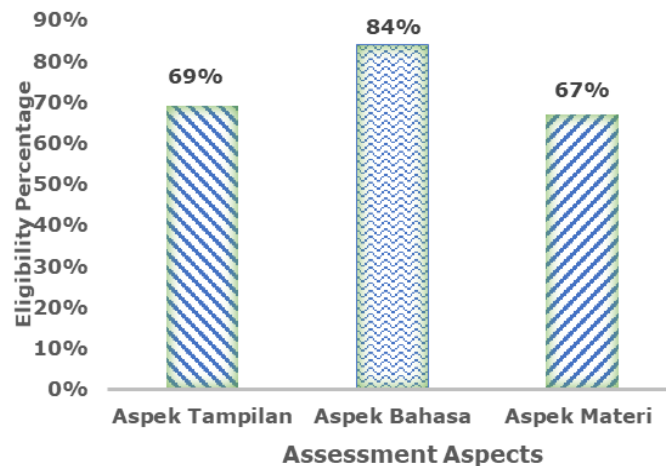


Image 9. Graph Percentage Media Eligibility

Based on graph above percentage media suitability in aspects appearance obtained by 69% with “valid” criteria , aspect Language obtained by 84% with "very valid" criteria , and aspects material obtained by 67% with criteria "valid". By whole results validation expert material and media experts can said own level good suitability .

After validation tests were carried out furthermore The lesson teacher's response test was carried out . Result of questionnaire the teacher's response shows that the average value obtained based on results lesson teacher response by 84% with very positive criteria . So the learning media is *stop motion* video on the material ecology This it's been very good as well as accepted with either by the lesson teacher the .

Stage development furthermore namely field testing For know response student towards learning media . Questionnaire results response students filled by 16 students with 14 questions show frequency 605 is very positive , 300 positive , 57 less positive , 2 no positive , and 8 very negative positive . The results of the data obtained percentage a total of 86.69% with "very positive " criteria . That matter in line with study previously carried out by Herlisa Syafira with results response Very positive students . Study previously by Nurul Arfah with results response students are very practical and improve motivation Study student . It means students are very interested with *stop motion* video learning media this and them accept very well .

According to writer results response student towards *stop motion* video learning media show that students are very enthusiastic moment watching video. Student feel get new atmosphere in the learning process . That matter interesting interest student in Study Because attractive and creative video display .

There is constraint in study This namely at stage development of *stop motion* video learning media . At stage media creation is very necessary great patience in move object from One to place others , and also need camera For take appropriate image so that Can produce nice and clear picture . with limitations camera with quality Good This Then researcher take picture in a bright place and with tool help lighting like *Ring Light* for the resulting image seen clear.

CONCLUSION

Based on data analysis and results study about development of stop-motion video learning media on material ecology student class X MA Al- Muwahidin Lelede, researcher can conclude that:

1. Development of stop motion video learning media on material ecology developed with using a 3D development model, namely, Define, Design (media design), Develop (media development) and a feasibility process is carried out from the validator.

2. Stop motion video learning media stated worthy based on evaluation from the validator with "valid" criteria so that the learning media This can used in the learning process.
3. Response student towards stop motion video learning media obtained assessment "very positive " which means learning media This accepted student with Good so that can used in the learning process at school.

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